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Biological Test Program for J - Division, LANL

A. Objective: The fundamental objective of the biological program is to provide information which can be used in planning effective medical care for the victims of atomic warfare, and for the victims of industrial accidents in nuclear energy plants. Such planning must necessarily depend on radiobiological studies which utilize the unique radiation of the atomic explosion. A satisfactory biological test program should provide data which can permit evaluation of atom bomb radiation injury in terms of the injurious action of roentgen, gamma and neutron radiations of a character that can be produced by conventional means in the laboratory. Adequate medical planning can not be anticipated until it is possible to translate laboratory conditions to field conditions with a high degree of certainty.

B. The Program: which has been approved by the Division of Biology and Medicine, Atomic Energy Commission, and J-Division, Los Alamos Scientific Laboratory:

1.0 Animal Colony: This project will provide an adequate number of animals for use at shot time. These animals will have been born and reared on Japtan island, and should then be acclimatized to the total local environment. Suitable control studies will be performed prior to the shots. The response of the animals will be tested with 250 KV x-ray after residence in the tropics. The plan should provide the following numbers of animals for the tests: 12,000 mice of LAF_1 strain; 120 American fox hound dogs; and 180 Duroc 'hairless' pigs.

2.0 Study of acute radiation injury: These studies will form a basis for a comparison of the biological response to short-burst radiation from the atom bomb with the response to ionizing radiation delivered at conventional rates.

2.1 Study of acute lethality, LD_{50}, and survivial versus dose and distance. (all species)

2.2 Study of histologic changes in tissues obtained by serial sacrifice after exposure. (all species)

2.3 Study of histochemical changes in tissues, as in 2.2

2.4 Study of changes in enzyme systems in tissues, as in 2.2

2.5 Study of protective agents on LD_{50}. (mice)

2.6 Study of effect of atom bomb radiation on longevity and carcinogenesis in survivors. (mice)

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3.0 Study of thermal injury (pigs)

3.1 Study of time relationships of burn to atom bomb detonation.

3.2 Study of action of various components of thermal radiation and ionising radiation in causation of burns.

3.3 Comparative study of changes in skin due to atom bomb burns and laboratory flash burns.

4.0 Study of hematologic changes due to atom bomb radiation (large animals)

4.1 Routine hemograms on all large animals

4.2 Study of hemorrhagic tendency in large animals with acute radiation injury

5.0 Study of distribution of fission products: This study will utilize animals exposed in project 2.0.

6.0 Biological dosimetry: The response of Tradescantia, Neurospora, mice, Aspergillus and corn will be studied to provide 'checks' with the physical dosimetry.

7.0 Study of genetical effects of atom bomb radiation: This study will utilize the Neurospora, Aspergillus and corn exposed in 6.0; and will extend previous observations of the same sort.

8.0 Observations of effects of atom bomb detonation on local fauna and flora by a qualified naturalist.

C. Organization: The biological test program is planned to be a cooperative activity involving representatives of the Atomic Energy Commission and the National Military Establishment. The individual studies will be performed under contract with the AEC. It is contemplated that all the biological research groups will obtain their animals from the animal colony, and will share the facilities of the biological laboratory. As a corollary, they should also share in the cost of the biological test program. The design of the majority of the experiments is such that most of the studies on the exposed material can be performed in the United States.

Respectfully submitted,

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George V. LeRoy, M. D.
Chairman, ad hoc Committee.

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